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Thomas

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[54] **SIXCON ADAPTOR**

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[73] Assignee: **The United States of America as represented by the Secretary of the Army**, Washington, D.C.

[21] Appl. No.: **759,824**

[22] Filed: **Nov. 13, 1996**

[51] **Int. Cl.**[6] **B65D 25/00**

[52] **U.S. Cl.** **220/561**; 220/1.5; 206/598; 206/599

[58] **Field of Search** 206/598, 599, 206/386; 220/1.5, 561

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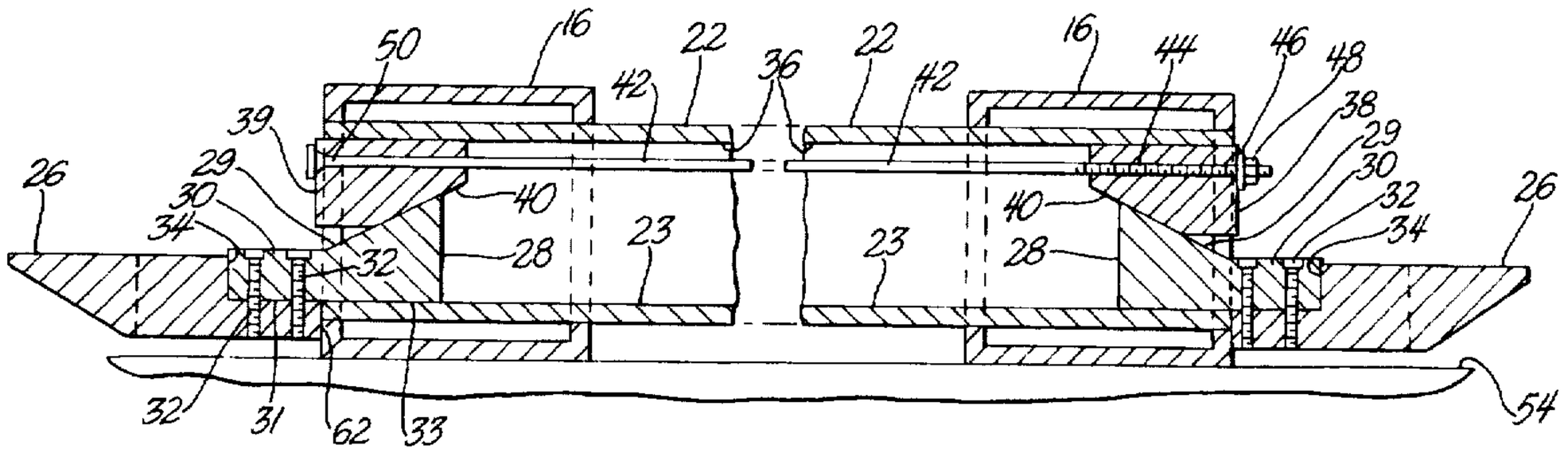
Primary Examiner—Joseph M. Moy

Attorney, Agent, or Firm—David L. Kuhn; Peter A. Taucher

[57] **ABSTRACT**

An adapter converts for aircraft use a cargo container whose fork lift access tubes pass through the container's frame. The adapter has first blocks at ends of the tubes, and wedge portions of the first blocks face on the tubes' insides. Adapter members affix to the first blocks and extend along the container's base. Second, wedge-like blocks at the tubes' ends face against both the tubes' insides and the first blocks. The second blocks move together to lock the first blocks in place. The mechanism to force the second blocks together includes elongate members in the tubes. One end of each elongate member is threaded and passes through one of the second blocks while the other end of the elongate member connects to another second block. Turning a nut on the elongate member forces the one second block toward the other second block.

18 Claims, 3 Drawing Sheets



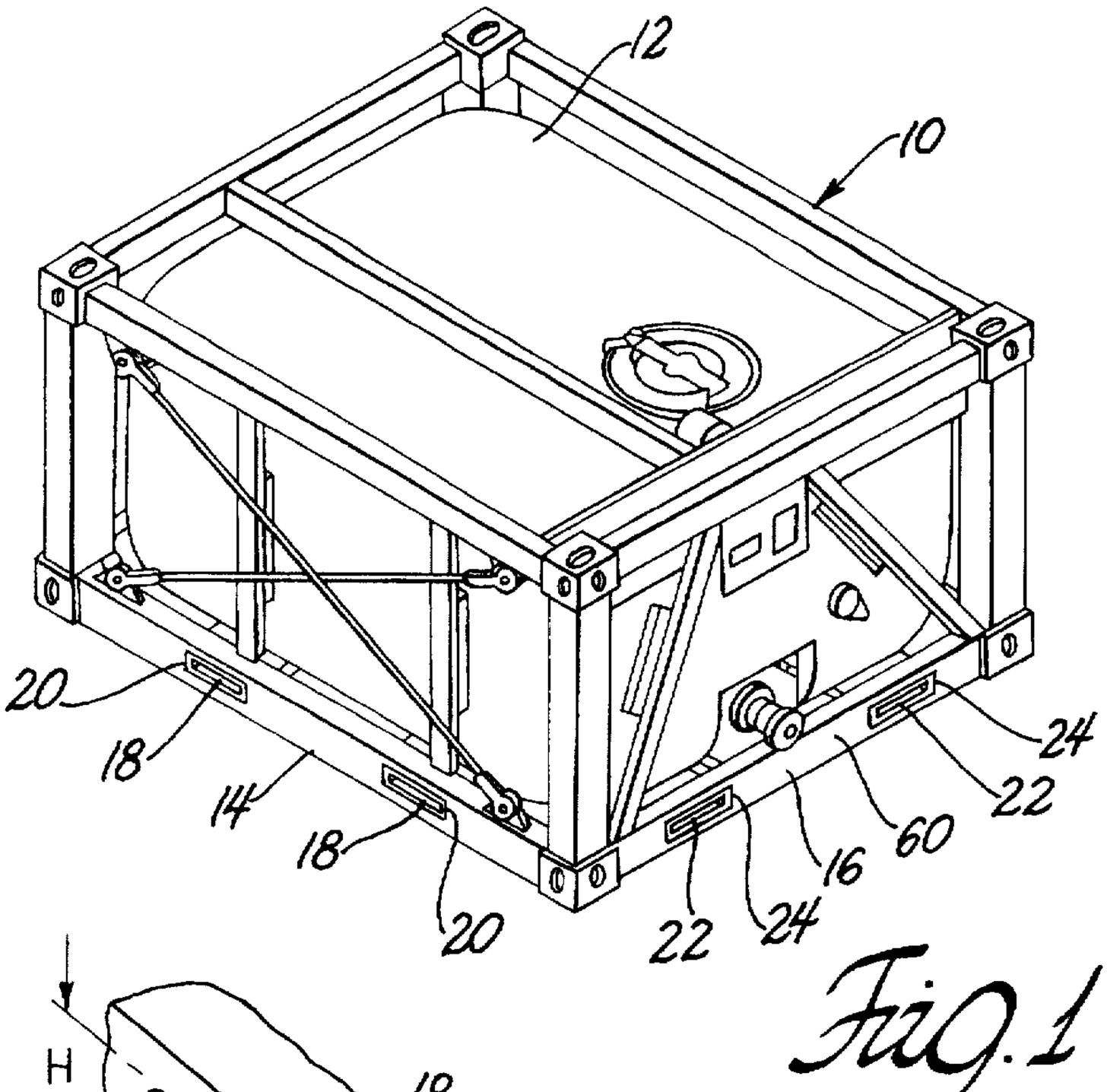


Fig. 1

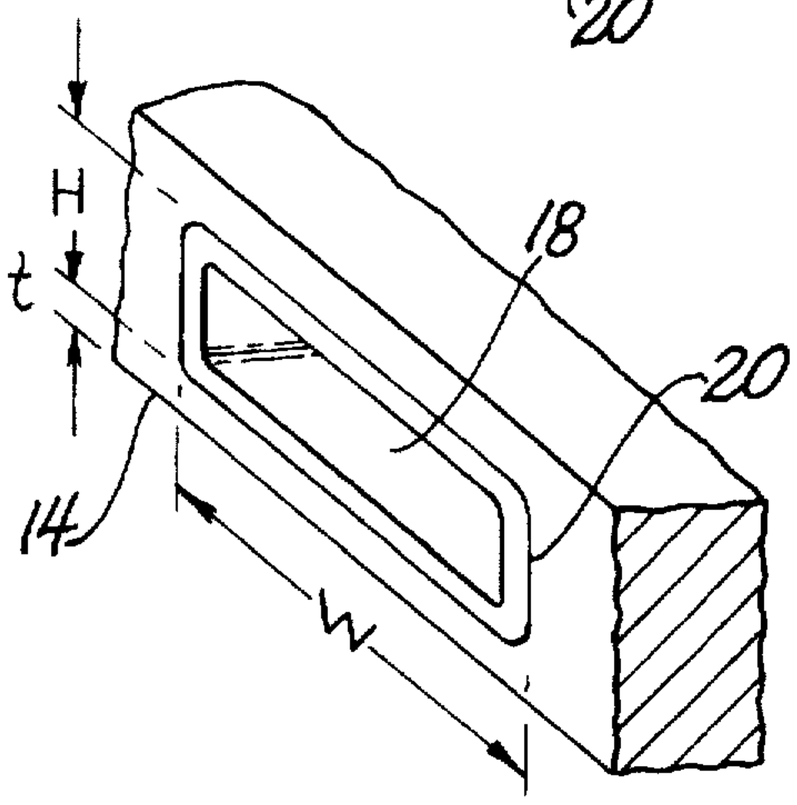


Fig. 2

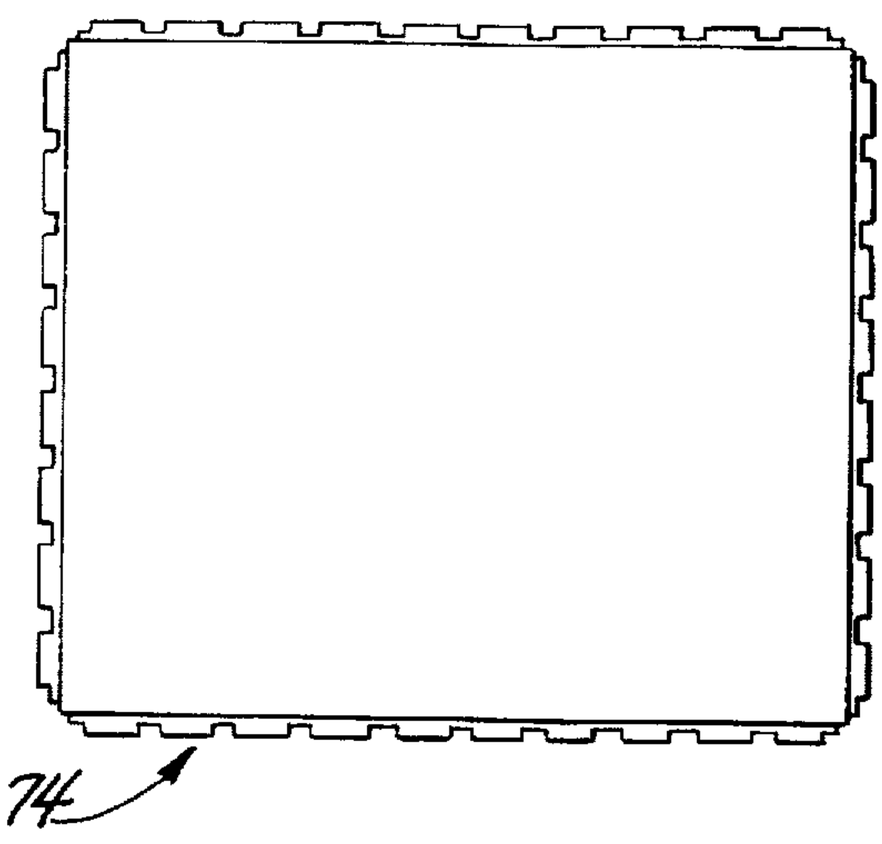


Fig. 3

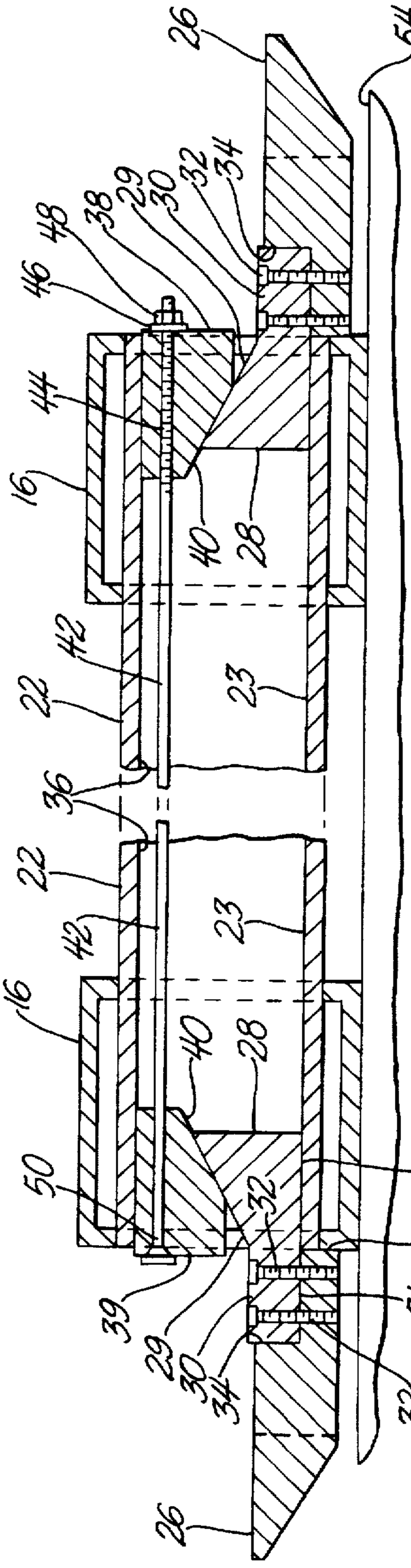


Fig. 11

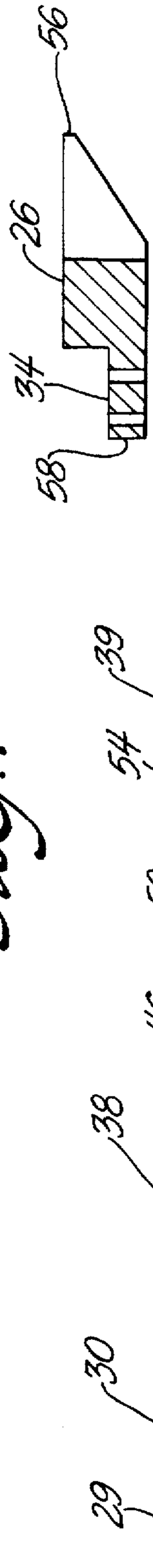


Fig. 10

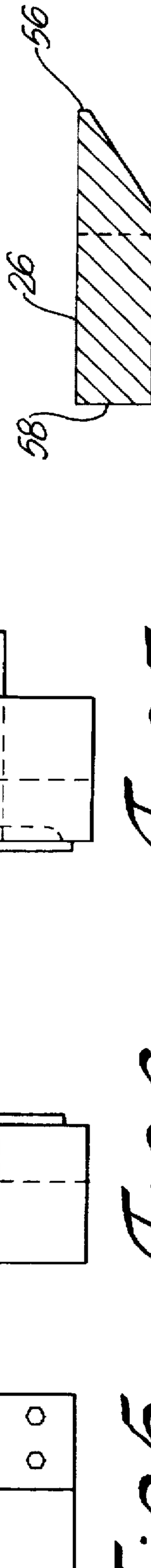


Fig. 9

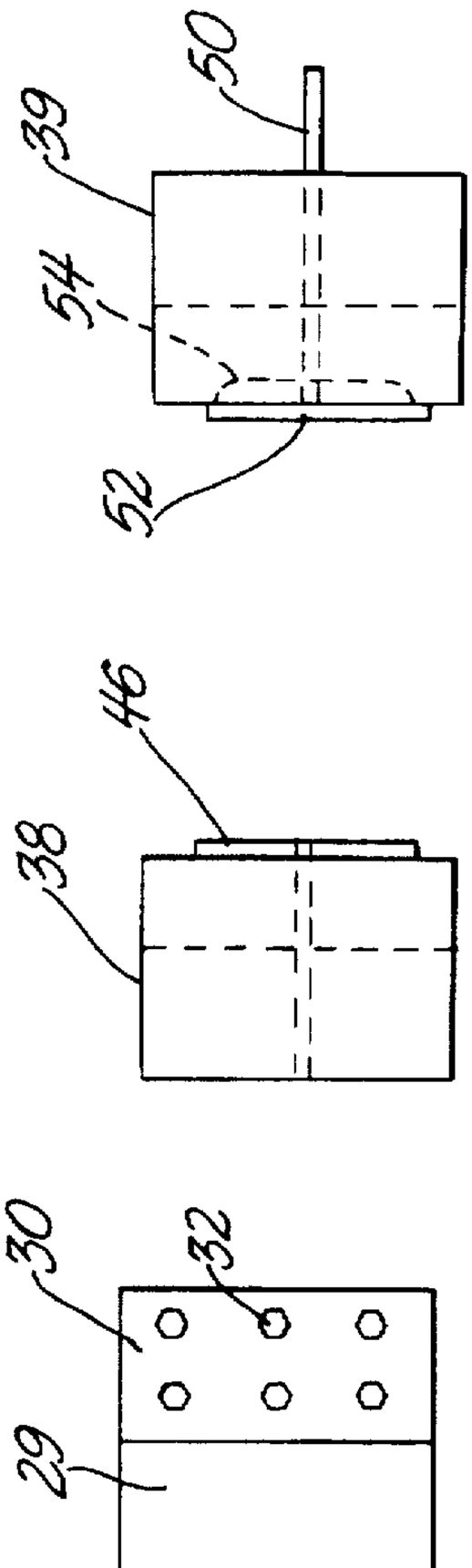


Fig. 7

Fig. 6

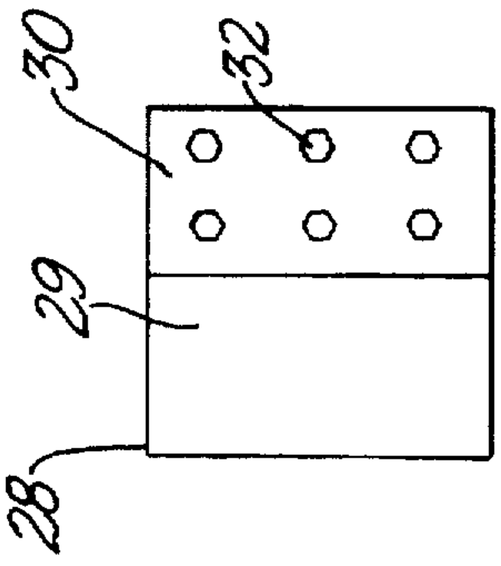


Fig. 5

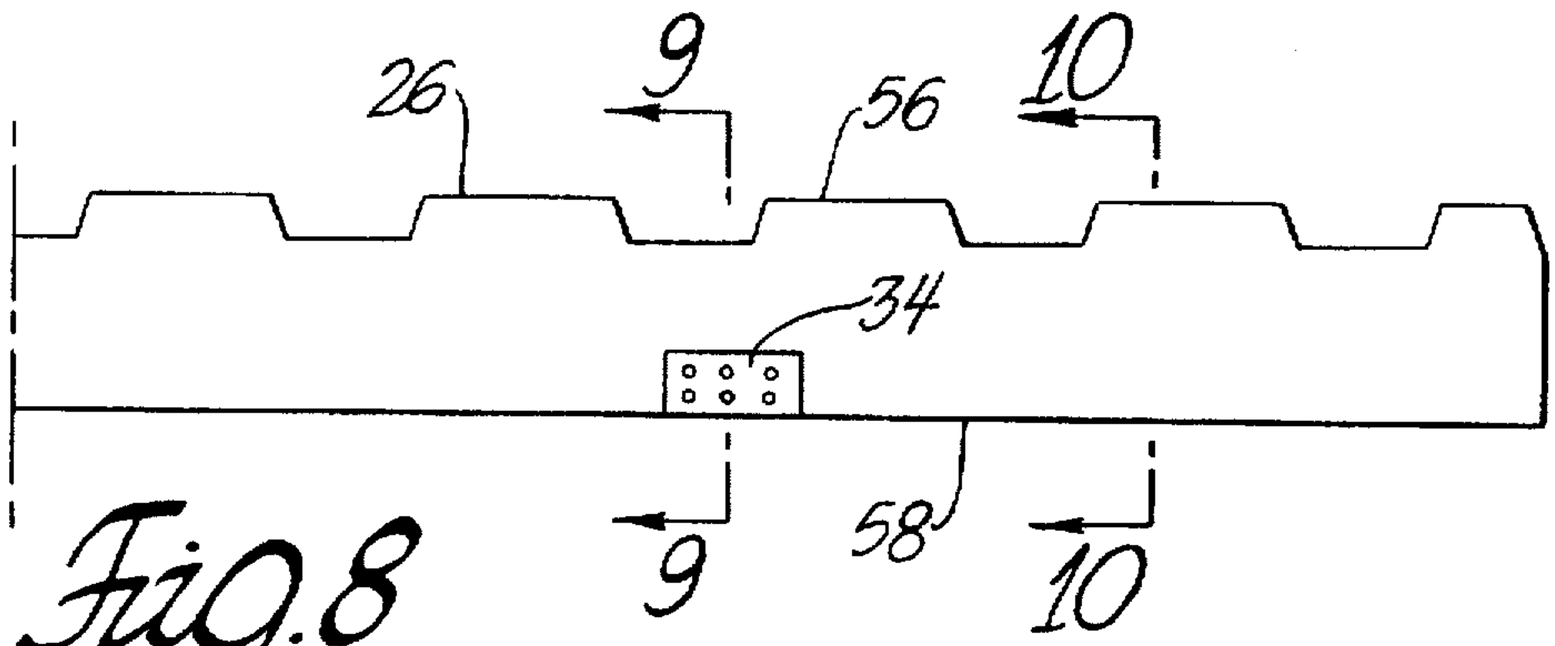


Fig. 8

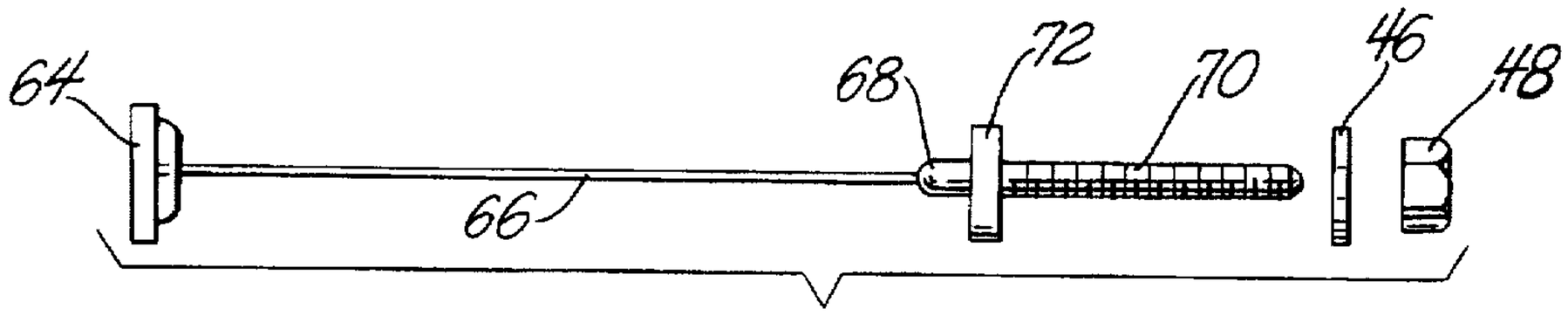


Fig. 11

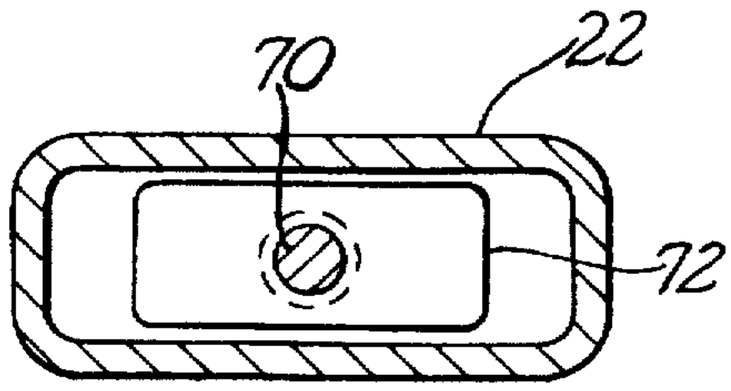


Fig. 13

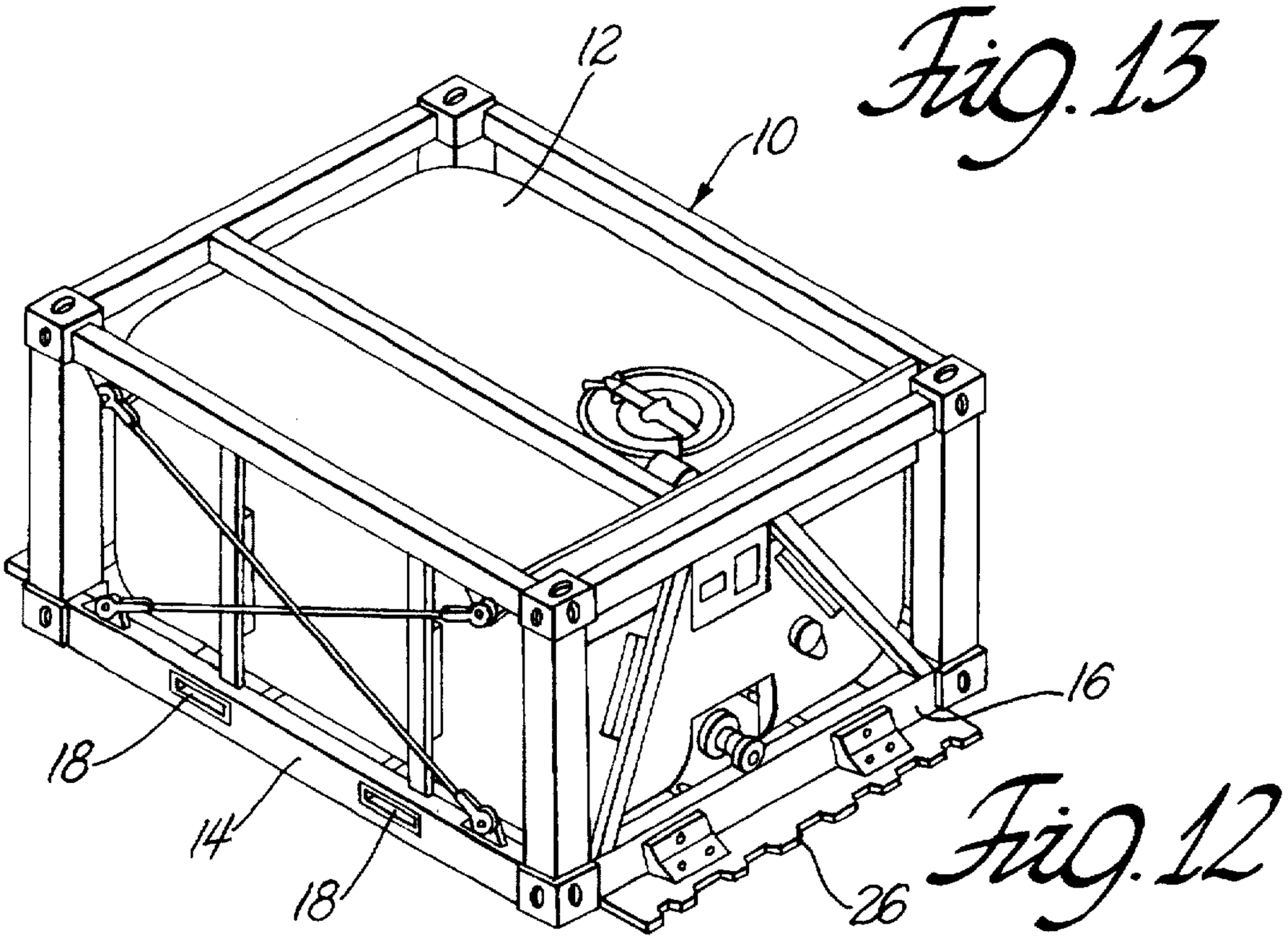


Fig. 12

SIXCON ADAPTOR

GOVERNMENT USE

The invention described here may be made, used and licensed by or for the U.S. Government for governmental purposes without paying me royalty.

BACKGROUND AND SUMMARY

Modern military logistics requires shipping containers that can be taken off land vehicles and loaded onto military aircraft having standard cargo bay fixtures or hold-downs. However, certain kinds of overland shipping containers, especially open frame SIXCON containers, are not well suited for military aircraft. Such shipping containers require extra man hours for lading and can cause shipping delays.

I have invented a removable adapter that addresses the foregoing problem. My removable adapter converts a SIXCON or like container for stowage in a standard military aircraft cargo bay. My adapter utilizes the container's fork lift access tubes, which pass through the base of the container's frame. The adapter has first blocks at openings of the tubes. The blocks are positioned so that their wedge portions face on the tubes' insides. Flat, crenelated skirts are adapter members which attach to the first blocks and extend along the container's base.

Second, wedge-like blocks at the tubes' openings are pulled toward one another so as to squeeze the first blocks against the tubes' insides. The mechanism to force the second blocks together has elongate members extending through the tubes. A threaded end of each elongate member passes through one of the second blocks; the opposite end of the elongate member connects to another second block. Turning a nut on the threaded end forces the second blocks toward each. The first blocks are jammed in place, thereby fixing the adapter members to the SIXCON container.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a known SIXCON container.

FIG. **2** is a detail view showing the opening of a fork lift access tube at the base of the SIXCON container.

FIG. **3** shows an outline of a cargo pallet used for military air shipments, which outline is achieved by installation of adaptor members on the SIXCON container.

FIG. **4** is a sectioned side elevational view of my adapter installed in a fork lift access tube.

FIG. **5** is a plan elevational view of a first block, by which adapter members are connected to the SIXCON container.

FIG. **6** is a plan elevational view of a second block used to lock first blocks in position in the access tube.

FIG. **7** is a plan elevational view of another second block.

FIG. **8** shows one half of an adapter member for the SIXCON unit.

FIG. **9** is a view taken along line **9—9** in FIG. **8**.

FIG. **10** is a view taken along line **10—10** in FIG. **8**.

FIG. **11** is an alternate version of a mechanism to pull the second blocks together, the first version being shown in FIG. **4**.

FIG. **12** is a perspective of the SIXCON container with one of the adapter members thereon.

FIG. **13** is a detail view of an anti-rotation mechanism used on the FIG. **11** mechanism.

DETAILED DESCRIPTION

FIG. **1** shows SIXCON unit **10**, a conventional open-frame cargo container used in semi-trailers or box cars and

typically used for shipping fuel cells such as tank **12**. The bottom of unit **10** is a rectangular frame having two parallel longitudinal beams **14** connected to two parallel transverse beams **16**. Unit **10** has two sets of tubes which accept the blades of a fork lift: crosswise tubes **18** and lengthwise tubes **22**. Crosswise tubes **18** run parallel to beams **16**, extend between and through beams **14**, and terminate in openings **20** on the exterior of unit **10**. Lengthwise tubes **22** run parallel to beams **14**, extend between and through transverse beams **16**, and terminate in openings **24** at the front and rear of unit **10**. As exemplified by opening **22** in FIG. **2**, all the openings have a common width W, common height H and are a common distance t from the bottom of beams **14** or **16**.

FIG. **12** shows unit **10** as provided with an adaptor member **26** fixed to transverse beam **16**. It will be understood that adaptor members **26** can be affixed to both transverse beams **16** and that adaptor members can be affixed to both longitudinal beams **14** as well. When all four adaptor members are installed on unit **10**, the base of unit **10** will have the outline **74** shown at FIG. **3**, which is the outline of a cargo pallet used for military air shipments. Preferably, when adapter members **26** are attached to unit **10** they are spaced above the surface **54** (FIG. **4**) on which unit **10** rests, whereby members **26** do not bear the weight of unit **10**.

FIG. **4** shows details of construction by which adaptor members **26** are removably attached to unit **10**. In that Figure, tube **22** extends between and through transverse beams **16**. Disposed partly in tube **22** are wooden blocks **28** lying flat upon the floor surface **23** of tube **22**. Blocks **28** have wedge portions **29** that are integrally adjacent to feet **30** which extend out of tube **22**. The bottoms **31** of feet **30** are flat and flush with bottom **33** of wedge portion **29**. Adaptor members **26** are screwed or bolted to feet **30** by threaded fasteners **32**. The feet fit into shallow notches **34** of the adaptor members, one of notches **34** being shown in the FIG. **8** plan view of adaptor **26**. Floating wooden blocks **38** and **39** are essentially wedges that fit between the ceiling surface **36** of tube **22** and portions **29** of fixed blocks **28**. Floating blocks **38** and **39** have bearing surfaces **40** which are oblique to tube surfaces **23** and **36**, surfaces **40** sliding facially upon wedge portions **29**.

An elongate member such as rod **42** passes through tube **22** and also passes through floating block **38**, one end **44** of the rod being threaded. Threaded end **44** passes through plate **46** fixed to the outward facing surface of the blocks **38** and a nut **48** threaded to rod **40** is adjacent plate **46**. As seen in FIG. **7**, the other end **50** of rod **42** terminates in an anchor plate **52** having an elongate ridge **54** that congruently fits in a complimentary recess in floating block **39**. The engagement between ridge **54** and the complimentary recess comprise an anti-rotation mechanism that prevents rod **42** from turning as nut **48** is turned. Rotating nut **48** in the proper direction moves blocks **38** and **39** toward one another until they jam or wedge against blocks **28**. Consequently, blocks **28** are fixed in place and are therefore can be deemed as fixed blocks. Removal of nut **48** from rod **42** allows rod **42** and floating block **39** to be removed from tube **22**, whereupon floating block **38**, and fixed block **28** can also be removed and thereby disassembling adapter members **26** from unit **10**.

FIGS. **8**, **9** and **10** show details of construction of adapter member **26**, which has a flat, skirt-like configuration. In FIG. **8** is shown an outer, crenelated edge **56** that mates to standard fixtures in the cargo bay of transport aircraft. The opposite, inner edge **58** is flat so as to make surface contact with exterior beam surface **60** (FIG. **1**) of transverse beam **16** or a like exterior surface of longitudinal beam **14**. Such

surface contact is exemplified by interfaces **62** (FIG. **4**) when adapter members **26** are installed on unit **10** at transverse beams **16**.

FIG. **11** shows a block retention member which optionally replaces rod **42** in the FIG. **4** structure. The block retention member includes a flexible tension cable **66** fixed at one end to anchor plate **64**, which has the same configuration as anchor plate **52**. The other end of cable **66** is fixed to shank **68** of rigid threaded member **70** which passes through floating block **38** and plate **46** in the same manner as does rod end **44**. As seen in conjunction with FIG. **13**, threaded member **70** includes an anti-rotation mechanism in the form of collar **72**, which prevents member **70** from rotating with respect to tube **22**. Threading nut **48** onto member **70** pulls floating blocks **38** and **39** together in much the same fashion as would threading nut **48** onto rod **42**.

I do not desire to be limited to the exact details of construction or method shown herein since obvious modifications will occur to those skilled in the relevant arts without departing from the spirit and scope of the following claims.

What is claimed is:

1. A structure to adapt a cargo container for one kind of transport vehicle to another kind of transport vehicle, wherein the container has a frame and a tube passing through the frame, the structure comprising:

first blocks at ends of the tube contacting an inner peripheral surface of the tube;

adapter members fixed to the first blocks, the adapter members abutting the container;

second blocks at the ends of the tube and at least partly in the tube;

wherein the second blocks oppose the first blocks;

means for forcing the second blocks toward one another and jamming the second blocks against the first blocks.

2. The structure of claim **1** wherein the forcing means comprises:

an elongate member connected to one of the second blocks and passing through another of the second blocks.

3. The structure of claim **2** wherein the forcing means further comprises:

threads on the elongate member;

an internally threaded member on the elongate member.

4. The structure of claim **3** wherein the forcing means further comprises means to prevent rotation of the elongate member.

5. The structure of claim **1** wherein the adapter members are spaced from a surface on which the cargo container rests.

6. The structure of claim **1** wherein the first blocks are in facial contact with the second blocks.

7. A structure to adapt a cargo container for one kind of transport vehicle to another kind of transport vehicle, wherein the container has a frame and a tube passing through the frame, the structure comprising:

first blocks at either end of the tube;

wedge portions of the first blocks bearing against a first inner peripheral surface of the tube;

feet of the first portions extending at least partly out of the tube;

adapter members fixed to the feet, the adapter members being in surface contact with the container;

second blocks at either end of the tube, the second blocks faced against a second inner peripheral surface of the tube opposing the first inner peripheral surface;

wherein parts of the second blocks oppose the wedge portions;

means for forcing the second blocks toward one another and jamming the second blocks against the first blocks.

8. The structure of claim **7** wherein the forcing means comprises:

an elongate member in the tube;

means at one end of the elongate member for connecting one of the second blocks to the elongate member;

another of the second blocks defining an aperture through which passes the elongate member.

9. The structure of claim **8** wherein the forcing means further comprises:

threads at another end of the elongate member;

an internally threaded member on the elongate member.

10. The structure of claim **9** wherein the forcing means further comprises means to prevent rotation of the elongate member with respect to the tube.

11. The structure of claim **7** wherein the adapter members are spaced from a surface on which the cargo container rests, whereby the adapter members do not bear weight of the cargo container.

12. The structure of claim **11** wherein the first blocks are forced facially against the second blocks.

13. A structure to adapt an open frame cargo container for one kind of transport vehicle to another kind of transport vehicle, wherein the container includes a frame and fork lift access tubes passing through a base of the frame, the structure comprising:

first blocks at either end of the tube;

wedge portions of the first blocks bearing against a first inner peripheral surface of the tube;

feet of the first portions extending at least partly out of the tube;

adapter members fixed to the feet, the adapter members being in surface contact with the container and extending along the base of the container;

second, generally wedge shaped blocks at either end of the tube, the second blocks faced against a second inner peripheral surface of the tube opposing the first inner peripheral surface;

wherein planar surfaces of the second blocks face upon the wedge portions;

means for forcing the second blocks toward one another and jamming the second blocks against the first blocks.

14. The structure of claim **13** wherein the forcing means comprises:

an elongate member in the tube, at least part of the elongate member being rigid;

means at one end of the elongate member for retaining one of the second blocks on the elongate member;

another of the second blocks defining an aperture through which passes the elongate member.

15. The structure of claim **14** wherein the forcing means further comprises:

threads at another end of the elongate member;

an internally threaded member on the threads of the elongate member;

the other second block disposed between the internally threaded member and the one second block.

16. The structure of claim **15** wherein the forcing means further comprises means to prevent rotation of the elongate member with respect to the tube.

17. The structure of claim **13** wherein the adapter members are flat flange-like members running along the base of the container and spaced from a surface on which the cargo container rests.

18. The structure of claim **17** wherein the first blocks are forced by the forcing means facially against the second blocks.

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